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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/606,407	06/29/2000	Jang Jin Yoo	8733.20135	7073

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/606,407

Applicant(s)

YOO ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-11, 17 and 19-36 is/are rejected.
- 7) ☒ Claim(s) 4-6, 12-16, 18 and 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3. 6) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
2. The following title is suggested: "Multi-domain liquid crystal display device having electric field distortion dielectric structures patterned differently within neighboring pixels"

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 28-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 28 taken by itself seems to imply that the alignment film is different in some particular way in at least two regions, causing the liquid crystal to have different alignment characteristics in each region. However, it does not say this, and claims 29 and 30 imply that the alignment films in the two regions in claim 28 may be identical in alignment, or in being not aligned. If both regions are not aligned, as in claim 30, how can they be responsible ("so that" in line 3 of claim 28) for different alignment characteristics? Also, please detail what processes can be performed on an alignment

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layer while leaving it "not aligned". For examining purposes, it is assumed that claim 28 requires only two regions with different alignment characteristics, and "aligned" in claims 29 and 30 is interpreted to mean a rubbing or photo-alignment process is performed which affects the liquid crystal alignment, after the alignment layer is formed on the substrate (so baking the layer to harden it during the forming process would still leave the layer "not aligned").

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 7-11, 17, and 19-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lien*, U.S. Patent No. 5,907,380 in view of *Ueda et al.*, U.S. Patent No. 5,459,596.

Lien discloses [see Fig. 9, for instance] a multi-domain liquid crystal display device comprising a data line [31], a pixel electrode [26], a gate line [32], and a plurality of electric field distortion dielectric structures [62-1, 62-2] formed in different forms within neighboring pixels. *Lien* does not explicitly disclose a common auxiliary electrode formed to surround the pixel region.

Ueda does disclose [see Fig. 1, for instance] a common auxiliary electrode [113] formed to surround the pixel region, on the same layer as the gate line. It would have

been obvious to one of ordinary skill in the art to use the common auxiliary electrode of *Ueda* in the device of *Lien*, motivated among other reasons by *Ueda*'s teachings that this acts as a shield, reduces parasitic capacitance between the pixels and signal lines, and forms a storage capacitor without additional production steps [col. 9, lines 14-61]. Claims 35 and 36 are therefore unpatentable.

Lien also discloses [see Fig. 2, for instance] first and second substrates, a gate insulating film [col. 3, line 52], a light-shielding layer [23-1] on the second substrate, a color filter layer [23-2], a common electrode [28] on the color filter layer, and alignment films [38,40]. *Lien* does not explicitly show a passivation layer or the color filter layer being on the light-shielding layer, but these are conventional in the art and would be obvious to ones of ordinary skill in order to avail themselves of well-established production methods. Claim 1 is therefore unpatentable as well.

Ueda discloses that the pixel electrode overlaps the common auxiliary electrode, so claim 2 is unpatentable. Since the common auxiliary electrode in *Ueda* acts as a light shielding layer around the pixel edge, while the conventional light-shielding layer covers an overlapping region (including the TFT), it would be obvious to have them overlap, in order to ensure full coverage and account for possible slight misalignments, so claim 3 is unpatentable.

Claims 9-11, reciting the dielectric structures on the pixel electrode, common electrode, or color filter layer, are taught by *Lien* [see Fig. 6, for instance], so they are unpatentable. So are claims 23, 27, and 31, making them unpatentable.

Claim 21 is taught by *Ueda*, so it is unpatentable.

Claims 7, 8, 17, 19, 20, 22, 24-26, and 32-34 disclose well-known details of LCDs which would be obvious to ones of ordinary skill in the art, motivated by the desire to avail themselves of conventional features.

Lien discloses dividing the alignment film into two regions [D1, D2], so that the liquid crystal molecules have different alignment characteristics in each region, and discloses rubbing for the alignment layers, so claims 28 and 29 are unpatentable. It is well-known in the art [see, as an example, *Lyu*, col. 2, lines 3-4] that alignment layers may be rubbed or not as desired; in other words, they may be "aligned" or not and still be made in a variety of ways to give desired alignment characteristics to the liquid crystal molecules; claim 30 is therefore unpatentable as well.

Allowable Subject Matter

7. Claims 4-6, 12-16, 18, and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art discloses a common auxiliary electrode as a capacitor electrode, which requires it to overlap the pixel; claims 4-6 would therefore be allowable.

The prior art does not disclose electric field induction windows in the passivation film, the gate insulating film, the color filter layer, or the over coat layer; claims 13, 14, 16, and 18 would therefore be allowable.

The prior art of record does disclose electric field induction windows in the pixel electrode and the common electrode, but there appears to be no motivation to combine these features with a device already electric field distortion structures for aligning the liquid crystal, or alternately for combining dielectric structures with a device already having windows in the pixel and/or common electrodes. Claims 12, 15, and 37 would therefore be allowable.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,285,431 to *Lyu et al.* discloses using apertures in the pixel and common electrodes to align the liquid crystal molecules within a pixel to make a multi-domain LCD having wide viewing angle. This reference teaches and motivates forming the apertures in adjacent pixel regions to have different directions and patterns, in order to widen the viewing angle. *Lien* discloses one of the possible "different forms within neighboring pixels"; it would be obvious to one of ordinary skill in the art to combine *Lien* with the teaching of *Lyu* to arrive at other "different forms" for the dielectric structures.

U.S. Patent No. 5,608,556 to *Koma* discloses a multi-domain LCD using apertures in the pixel and/or common electrodes, along with an orientation control electrode / common auxiliary electrode on the same layer as the gate electrode, to align liquid crystal molecules.

U.S. Patent No. 6,097,464 to *Liu* discloses a multi-domain LCD using dielectric bumps to align liquid crystal molecules. Fig. 2 shows unidentified and unlabeled prior art which appears to show dielectric structures having different forms in neighboring pixels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703) 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-4711 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Andrew Schechter
November 20, 2001


TOANTON
PRIMARY EXAMINER